Team Number \_\_\_\_\_\_ Team Names \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The Border Problem: Multiple Representations

Yesterday we wrote 6 equations for solving the border problem. Each equation gives a *function rule* for finding the number of border squares on any size grid. A function states the relationship between two quantities. In the border-problem function, the number of border squares, depends on the size of the grid and is called the dependent variable. The dependent variable is placed on the vertical axis of the graph. The number of squares along each side of the grid, , is called the independent variable. The independent variable is placed on the horizontal axis of the graph.

**Multiple Representations of Functions** We can represent or describe functions using equations, pictures, words, tables, and graphs.

1. **EQUATION** In simplest form, all 6 equations become

Equation

. We will use this form of the equation today.

Write in the box.

2. **VERBAL DESCRIPTION** Use words to explain the function rule represented by the

equation, .

2. **TABLE** Complete the table of values.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Side length | 3 | 4 | 5 | 6 | 7 | 8 |
| Border Squares |  |  |  |  |  |  |

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3. **PICTURE** Draw each grid size. Shade the border squares. Use the pictures to check your

Table values. 

****4. **GRAPH** Graph the ordered pairs from the table. Label each axis.

5. Explain the meaning of the point .

6. Explain how to use the graph to find the number of squares on the boarder of a grid.

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7. When the graphed points of a function “line up”, the function is called a linear function.

Explain why the border-problem function is linear. (That is, explain what there is about this function

that makes the points line up.)

8. The number of border squares is increasing by 4 each time the grid size increases by 1. Use a pink

highlighter or colored pencil to show where this growth rate is found on the equation, the verbal

description, the table, and the graph.